

Indian Springs – A Local Wetland

A Natural Resource/Field Study
for Teaching K-5 Science/STEM



Engaging Students in Science/STEM Using the Indian Springs Wetland

There is no doubt that successful learning is directly related to student perceptions about its relevance, purpose and authenticity. Students are more motivated to learn if they see a clear connection and relevance of schooling to their lives. If it is our desire to engage students, then they must see the work they do as significant, valuable, and real. In other words, schoolwork must be seen as being meaningful to students.

Student engagement occurs when students make a psychological investment in their learning and see relevance to what they are learning in their everyday lives. They devote more time and try harder to understand what their teachers present when they are engaged. They take pride not simply in earning the formal indicators of success (grades), but in understanding the material and incorporating or internalizing it into their lives. Student engagement is increasingly seen as an indicator of successful classroom instruction, and as a valued outcome of school reform. Student involvement in real world projects (project-based learning) using local environments, such as the Indian Springs Wetland, has proven to be a powerful way to engage students of all grade levels.

The curriculum matrix that follows was designed to correlate with state and national standards and provide both students and teachers with digital and print resources that would engage them in real world science/STEM studies of the Indian Springs Wetland. The matrix is designed primarily around the Virginia Standards of Learning in Science and employs an *Understanding by Design* (Wiggins and McTighe, 1998) template consisting of enduring understandings and essential questions.

This curriculum that follows and the educational signs shown here and displayed on the Indian Spring Wetlands boardwalk, are the result of a partnership among a number of organizations including the Woodstock Tree Board, Friends of the North Fork of the Shenandoah River, the United States Forest Service, the VA Department of Forestry, Central High School and James Madison University. Friends of the North Fork is greatly indebted to Dr. Hays B. Lantz and the assistance of Dr. Michael Snyder in the development creation of the following curriculum.

Educational Signs at the Indian Spring Wetland on Water Street in Woodstock, Virginia

Indian Spring Wetland



Where is Indian Spring?

The spring that feeds the wetland is located across Water Street on private property.



Today: Reclaiming the Spring

The Indian Spring Wetland property was donated to the Town of Woodstock in 2005 by Mr. I. Clinton Miller.



Restoration project, 2009

Yesterday: Early Visitors

Though little remains of their passing, it is thought that Native Americans from the Shawnee, Delaware, Cherokee, and Iroquois Tribes traveled through this area along the Warriors Path. Today we call this same route Old Valley Pike or Route 11.

Town records show European settlers began moving into the Indian Spring area in 1730.

Indian Spring was officially added to the Town of Woodstock on June 4, 1892. The original town limits were marked by four large oak trees, one of which stood in this area.

African American residents often gathered here for social and religious gatherings well into the 1900s.



Photo Courtesy of The Free Press

Since then, students from James Madison University and Central High School have volunteered for the Woodstock Tree Board to restore the health of this wetland by removing invasive trees and cleaning up trash.



Restoration project, 2008

Photos by Meredith Hoffman-Bauserman

What is a Wetland?



A wetland is an area of land that is saturated with water. It supports trees, plants, wildlife and insects that can live in a wet area. Wetlands can be wet or dry, but all of them are covered with water at least some of the time.

What is Unique About Indian Spring?

Indian Spring is unique because it is seasonally flooded. This means that you only see surface water certain times of the year. Indian Spring tends to be wet in the winter and spring and dry in the summer and fall.



Why Are Wetlands Important?

Wetlands are important to wildlife. They provide homes and food for plants, birds, animals and insects.

Wetlands play a role as filters, trapping pollution and sediment before they reach streams and rivers.

Wetlands control floods by trapping and storing water from heavy rain and snow. Then they slowly release the stored water downstream over time.



Indian Spring and Its Watershed

Indian Spring wetland is part of the Shenandoah River Watershed, the largest tributary of the Potomac River.

The Shenandoah and Potomac Rivers are part of the larger Chesapeake Bay Watershed. Most of the water that flows through the Indian Spring wetland eventually travels to the Chesapeake Bay over 200 miles away!

What lives in our Wetland?



The Wetlands are Being Invaded!

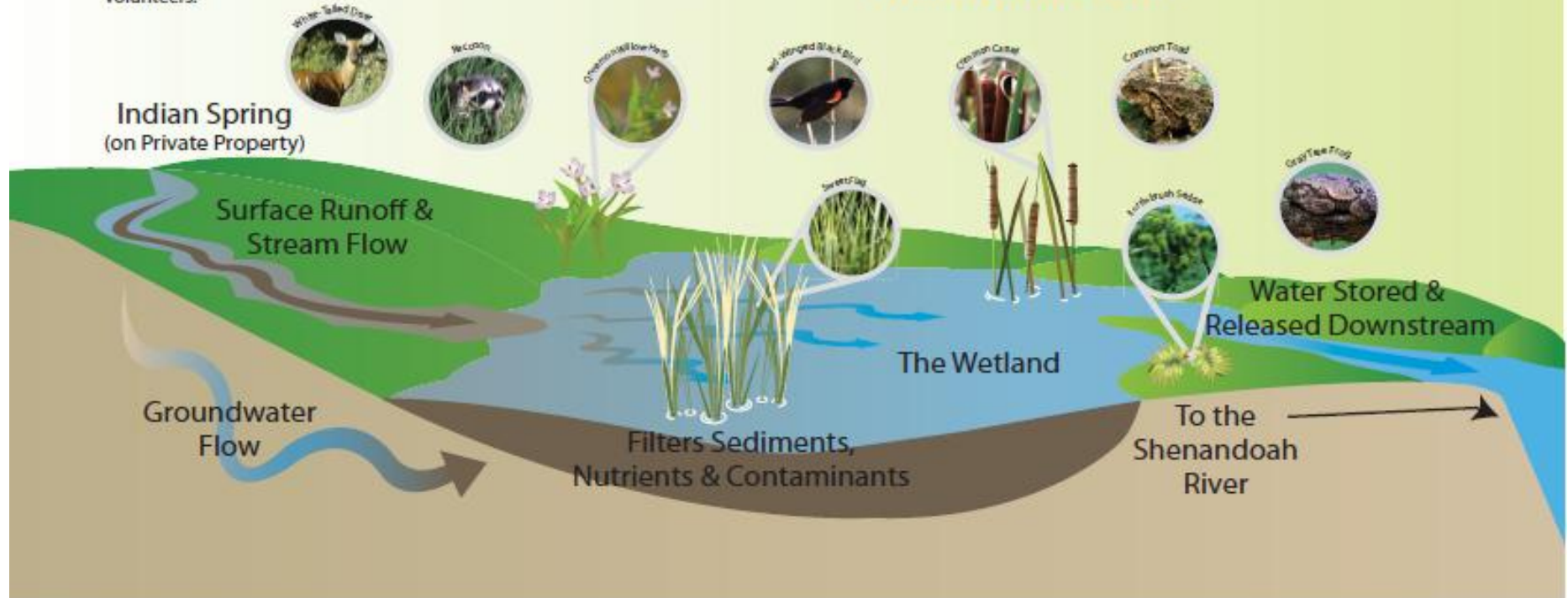
Invasive plants are plants in an ecosystem that do not belong. They grow aggressively, take the place of natural or native plants, and disrupt natural processes.

The four invasive (non-native) plant species found in this wetland were Siberian Elm, Tree of Heaven, Japanese Honeysuckle and Multiflora Rose. In an effort to allow the growth of native species, the invasive species are removed by volunteers.

What plants are native to Indian Spring Wetland?

The most common native plants are Dark Green Rush, Dudley's Rush, Common Cattail, Ironweed, Cinnamon Willow-Herb, Sweet Flag, Bottlebrush Sedge, Kentucky Bluegrass, Bushy Pondweed and Rice Cut Grass.

What else lives here?



Property History

Two local families, the Millers and Coopers, conveyed the Indian Spring Wetland and surrounding one-acre property to the town of Woodstock on February 20, 2005. Previous to this, records show that property changed ownership in eighteen separate land deeds since 1844, however this area did not actually become part of the town of Woodstock until 1892. Four large oak trees marked the original Woodstock town limits, and records show that one of those four used to stand on the property.

Woodstock, Virginia is the county seat of Shenandoah County, Virginia. It lays within the North Fork Shenandoah River Basin, which flows into the main stem of the Shenandoah River at Front Royal, Virginia (Figure 1). The Shenandoah River joins with the Potomac River at Harpers Ferry, West Virginia and from there, the river continues on to the Chesapeake Bay.



Figure 1: This map shows the Shenandoah River sub watersheds. The town of Woodstock is shown in the North Fork Shenandoah River watershed.

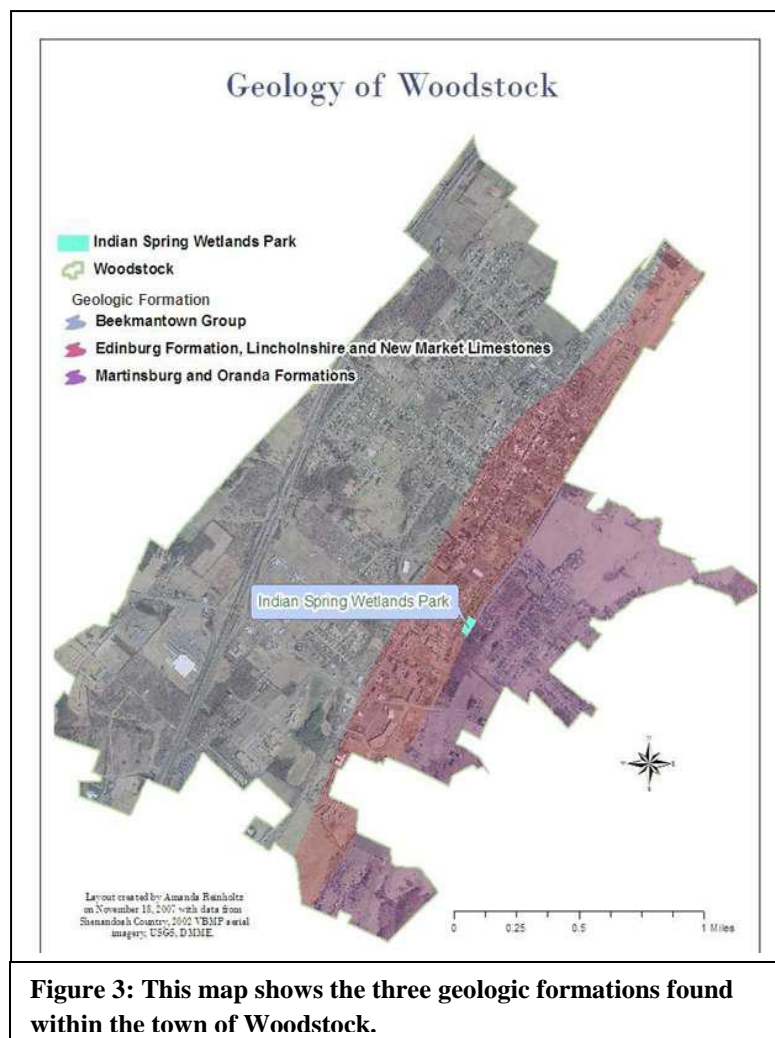


Figure 3: This map shows the three geologic formations found within the town of Woodstock.

and conduits” within a fairly low permeability rock matrix. However, these rock formations are mostly carbonate rock, which can be easily dissolved, enlarging fractures and changing the underground landscape over time. This hydrogeology makes it difficult to track where and how water is flowing underground. *A Karst landscape is very permeable, and is therefore very vulnerable to contamination from pollutants seeping into the groundwater.*

Geology

The town of Woodstock is located in the Shenandoah Valley and lies on three different geologic formations, as shown in Figure 3. Indian Spring and the Indian Spring Wetland are found on the Edinburg Formation/Lincolnshire Limestone and New Market Limestone, very close to the boundary of the Martinsburg and Orando Formations. *This boundary location is the most likely reason that the Indian Spring exists.*

A **spring** is a “natural discharge area” where water drains from the groundwater system. Springs are one of the main sources of surface water flow (streams or rivers) in the Shenandoah Valley, accounting for more than **85%** of the Shenandoah River Basin stream flow. Today, a pipe carries the water from the spring under Water Street and then discharges it on the other side as Indian Spring Run, where it flows through the wetland, as shown in the drawing in Figure 4.

The formations on which Indian Spring Wetland is located are made up of black and light to very dark gray limestone and shale. There are also compacted areas of silty clay. This type of formation is referred to as **Karst** and is characterized by springs, caves, and sinkholes. It is made up of a “network of interconnected fissures, fractures

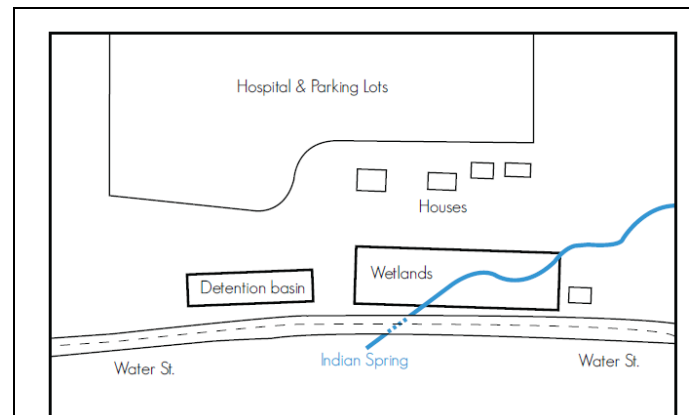


Figure 4: This diagram shows the location of the Indian Spring in relation to the wetlands.

Wetland Ecology

There are many types of **wetlands**, but the feature that is shared by all types is that the soil or substrate is at least periodically saturated with or covered by water. Wetlands inhabit the transitional zone between aquatic and terrestrial habitats; therefore both influence them. The individual characteristics of any wetlands are due to the differences in regional climates, soils, topography, landscape position, hydrology, water chemistry, and vegetation. The position of a wetland in relation to the surrounding land will affect the source of its water and the amount of water it receives. Wetlands can be precipitation dominated, groundwater dominated, or surface flow dominated.

Indian Spring Wetland is situated in a point of lower elevation relative to the surrounding landscape, so it is mostly dominated by overland flow from surface runoff, although it can be periodically recharged by groundwater. Overland flow dominated wetlands play an active role in the landscape of the surrounding area because they come in contact with, store, and release water as well as sediments and nutrients. This type of wetland is usually saturated with water during the winter months when plants are dormant and during early spring when the precipitation and runoff rates are high. They are usually dry during the summer and fall months except during flood conditions.

Some important major **functions of wetlands** are pollutant removal, flood attenuation, groundwater recharge and discharge, and providing wildlife habitat. Wetlands play a major role in water storage and groundwater recharge, making them valuable to water supply and flood control, as well as sinks for pollutants that are carried in runoff and from upstream. Wetlands that are located alongside streams, such as Indian Spring Wetland, are able to trap sediments and pollutants from ever reaching the stream and the larger bodies of water downstream, which in this case is the Chesapeake Bay. Due to the high level of nutrients from surface runoff and from upstream sources, wetlands typically have high primary productivity and are important ecological links and valuable habitats for the organisms living in and around them. Urban development around wetlands can potentially have a large impact on the functions of the area, mainly because the drainage area that the wetland serves, which is normally small, increases with the change of the land around it. Increased runoff from impervious surfaces into the wetland can cause sediment deposition, pollutant accumulation, increased chloride input from road salt, nutrient enrichment, and reduced abundance and diversity of wetland plants, aquatic insects, amphibians and birds.

More than half of the original wetlands located in the lower 48 states have been destroyed since the 1600s, and 22 states have lost at least 50% of their original wetlands. These wetlands have been drained and converted to farmland, filled for housing developments and industrial facilities, and used as landfills. Due to the destruction of such ecosystems, the protection and restoration of wetland areas has

WHAT ARE WETLANDS?

Wetlands are exactly that - "wet lands" – where there is standing water on the ground for at least part of the year, producing characteristic aquatic plants, like mosses, sedges, cattails, bulrushes, lily pads and pond weed. Wetland soils are either full of water or under water, and the plants that live there are adapted to growing in very wet conditions. You can find wetlands along the edges of rivers, streams, lakes, ponds or springs and between dry land and deep water.

Ducks Unlimited TEACHER'S GUIDE TO WETLAND ACTIVITIES

<http://www.greenwing.org/dueducator/ducanadapdf/teachersguide.pdf>

come to the forefront of ideas on protecting watersheds as a whole. A crucial part to making this happen is implementing plans at the local level to enrich wetland function.

Work Day at Indian Spring Wetland

As part of the effort to involve the community, the Woodstock Tree Board hosted a “clean-up day” at the Indian Spring Wetland in the fall of 2008. Tree Board members and their families, town employees, local volunteers, and a group of James Madison University students participated in the cleanup. Litter and trash were gathered and removed from the site and invasive species were removed. These species include Siberian Elm (*Ulmus pumila* L.), Tree of Heaven (*Ailanthus altissima*), Japanese Honeysuckle (*Lonicera japonica*), and Multiflora Rose (*Rosa multiflora*). These particular species were singled out for removal because of their known invasive tendencies toward excessive growth, spreading, and out competing native species. This workday was a very successful step in the involvement of the local community in this project.

Community Involvement

Many people and groups have helped plan, design and implement this wetland education project.

- The above information is from *Indian Spring Wetland Park* by Lindsay Wolfendale and Katherine Shepard, Integrated Science and Technology Senior Thesis Project; Dr. Maria Papadakis, Advisor; May 2009. This project included identifying potential community partnerships; exploring and identifying funding opportunities; developing educational signage; and exploring alternative landscaping for the Water Street storm water detention basin.
- The *Indian Spring Wetland Park: Natural Resources Management Plan* was written by the Fall 2007 Natural Resources Management Class at James Madison University for the Town of Woodstock.
- Meredith Bauserman and students from Central High School volunteered for the Woodstock Tree Board by helping with removal of invasive species and clean up of the wetland area.
- Dr. Hays B. Lantz and Dr. Michael Snyder worked with Friends of the North Fork of the Shenandoah River staff to write and compile the following teacher guide for grades K-5.
- Stephanie Bushong from the U.S. Forest Service provided educational and graphic design services to complete the signs for the wetland area.

Indian Springs – A Local Wetland

A Natural Resource/Field Study Guide for Teaching K-5 Science/STEM

Developed by Friends of the North Fork
of the Shenandoah River
July 2012

The following Guide can be found on the Friends of the North Fork Teacher Resource Page:

<http://riverandwaterresources.wikispaces.com/>

Grade Level	Enduring Understandings	Essential Questions	Correlated Virginia Standards of Learning (SOL) 2010	Digital and Print Resources for Teaching (including unit specific essential questions)
Kindergarten	<ul style="list-style-type: none"> The five senses are used to make observations and collect data about wetlands. Objects can be classified by physical properties. Water is important for life on Earth. Water can exist in different states. Wetlands are important resources for wildlife. Wetlands act as filters trapping pollution and sediments. 	<ul style="list-style-type: none"> How do people use their five senses to make observations and gather information? Why is water unique? How are wetlands dependent upon water? How do wetlands benefit plants, animals, and people? How do living components interact with non-living components in a wetland? 	<p>K.1 The student will conduct investigations in which</p> <ol style="list-style-type: none"> basic properties of objects are identified by direct observation; observations are made from multiple positions to achieve different perspectives; objects are described both pictorially and verbally; <p>K.2 Students will investigate and understand that humans have senses that allow one to seek, find, take in, and react or respond to information in order to learn about one's surroundings. Key concepts include</p> <ol style="list-style-type: none"> five senses and corresponding sensing organs (taste – tongue, touch – skin, smell – nose, hearing – ears, and sight – eyes); and <p>K.5 The student will investigate and understand that water flows and has properties that can be observed and tested. Key concepts include</p> <ol style="list-style-type: none"> water occurs in different states (solid, liquid, gas); the natural flow of water is downhill; and some materials float in water, while others sink. 	<p>What are the five senses? How do people use the five senses to make observations? How do we use our five senses to make observations in wetlands?</p> <p>Correlations to <i>Macmillan/McGraw-Hill Science</i> (2002) Unit 1, Learn About Your World.</p> <p>Websites</p> <p>BrainPop</p> <ul style="list-style-type: none"> http://www.brainpopjr.com/health/bodies/senses/preview.weml <p>Other Sites</p> <ul style="list-style-type: none"> http://www.littlegiraffes.com/fivesenses.html http://www.mrswillskindergarten.com/2011/04/my-five-senses-mini-unit-free.html http://worksheetplace.com/index.php?function=DisplaySheet&sheet=5-Senses-Words&links=2&id=&link1=241&link2=240 <p>What is water? Why is water unique? Why is water important to wetlands? What is the water cycle?</p> <p>Correlations to <i>Macmillan/McGraw-Hill Science</i> (2002) Unit 4, A Home Called Earth (Earth Science)</p> <ul style="list-style-type: none"> Topic 3, Lesson 2

			<p>K.6 The student will investigate and understand basic needs and life processes of plants and animals. Key concepts include</p> <ul style="list-style-type: none"> a) living things change as they grow, and they need food, water, and air to survive; b) plants and animals live and die (go through a life cycle); and c) offspring of plants and animals are similar but not identical to their parents and to one another. 	<ul style="list-style-type: none"> • Topic 4, Lessons 1-4 • Topic 6, lessons 1-4 <p>Websites</p> <p>BrainPop</p> <ul style="list-style-type: none"> • http://www.brainpopjr.com/science/weather/watercycle/preview.weml <p>Other Sites</p> <ul style="list-style-type: none"> • http://typeaparent.com/homeschool-kindergarten-science-lesson-plans-with-water.html • http://www.kidzone.ws/water/ <p>What is a wetland? Why are wetlands important? What are the different seasons in a wetland?</p> <p>Correlations to <i>Macmillan/McGraw-Hill Science</i> (2002) Unit 5, Weather and Seasons (Earth Science)</p> <ul style="list-style-type: none"> • Topic 6, Lessons 1-5 <p>Websites</p> <ul style="list-style-type: none"> • http://water.epa.gov/type/wetlands/wetlands.cfm • http://www.mbgnet.net/fresh/wetlands/index.htm • http://water.epa.gov/type/wetlands/people.cfm • http://el.erdc.usace.army.mil/wetlands/pdfs/ysw1.pdf <p>Book: <i>My Five Senses</i> by Alik</p>
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Grade Level	Enduring Understandings	Essential Questions	Correlated Virginia Standards of Learning (SOL) 2010	Digital and Print Resources for Teaching (including unit specific essential questions)
First Grade	<ul style="list-style-type: none"> Science is a structured process for asking and answering questions about our natural and human-made environment. Scientists design and conduct investigations to gather data and information to answer questions about natural phenomena. The five senses can be used in science to make observations and collect data. Plants and animals can be classified based upon physical properties. Plants and animals including humans have needs for life. 	<ul style="list-style-type: none"> What is science? How do people use their five senses and tools of science to make observations and collect data? What makes wetlands unique? How do wetlands benefit plants, animals, and people? How do the living components and non-living components interact in a wetland? 	<p>1.1 The student will conduct investigations in which</p> <ol style="list-style-type: none"> differences in physical properties are observed using the senses; simple tools are used to enhance observations; objects or events are classified and arranged according to attributes or properties; observations and data are communicated orally and with simple graphs, pictures, written statements, and numbers; length, mass, and volume are measured using standard and nonstandard units; predictions are based on patterns of observation rather than random guesses; simple experiments are conducted to answer questions; and inferences are made and conclusions are drawn about familiar objects and events. <p>1.3 The student will investigate and understand how different common materials interact with water.</p> <p>Key concepts include</p> <ol style="list-style-type: none"> some liquids will separate when mixed with water, but others will not; 	<p>What is science? How do we use our five senses in science? How do tools and technology help us make observations and collect data? How do we use our five senses and tools of science to make observations in a wetland?</p> <p>Correlations to <i>Macmillan/McGraw-Hill Science</i> (2002) Unit A, Lesson 1, Your Senses</p> <p>Webquest</p> <ul style="list-style-type: none"> http://www.google.com/url?sa=t&rct=j&q=&esrc=s&frm=1&source=web&cd=8&ved=0CH8QFjAH&url=http%3A%2F%2Fstudents.wsc.ma.edu%2Fjbonafilia%2F1226%2FWeb%2FPowerpoint%2FThe%2520Five%2520Senses.ppt&ei=s-GjT5uvF-r50gHw_fnGCQ&usg=AFQjCNE98Mje78DG9aG9hbMzU2wMDzcsdg&sig2=IIV7ja0lvmoHZRFs3M2S- <p>Websites</p> <p>BrainPop</p> <ul style="list-style-type: none"> http://www.brainpopjr.com/science/scienceskills/scienceprojects/preview.weml http://www.brainpopjr.com/health/bodies/senses/preview.weml http://www.brainpopjr.com/science/scienceskills/scientificmethod/preview.weml

	<ul style="list-style-type: none"> • All wetlands are wet (or seasonally wet), have special (hydric) soils, and have special plants that can survive wet conditions. • Water can exist in different states. • Many different plants and animals rely on wetland habitats as sources of food, breeding and nesting sites, and safe stopovers during migration. • Wetlands change over time (i.e. beavers can change wetland habitats for other plants and animals when they build and abandon ponds). • Wetlands act as filters trapping pollution and sediments. 	<ul style="list-style-type: none"> • How do wetlands change with the seasons? • Why is water a unique chemical? 	<p>b) some common solids will dissolve in water, but others will not; and</p> <p>c) some substances will dissolve more readily in hot water than in cold water.</p> <p>1.4 The student will investigate and understand that plants have life needs and functional parts and can be classified according to certain characteristics. Key concepts include</p> <p>a) needs (food, air, water, light, and a place to grow);</p> <p>b) parts (seeds, roots, stems, leaves, blossoms, fruits); and</p> <p>c) characteristics (edible/nonedible, flowering/nonflowering, evergreen/deciduous).</p> <p>1.5 The student will investigate and understand that animals, including people, have life needs and specific physical characteristics and can be classified according to certain characteristics. Key concepts include</p> <p>a) life needs (air, food, water, and a suitable place to live);</p>	<ul style="list-style-type: none"> • http://www.brainpopjr.com/science/sciencskills/makingobservations/previww.weml • http://www.brainpopjr.com/science/sciencskills/tallychartsandbargraphs/ <p><u>Other Sites</u></p> <ul style="list-style-type: none"> • http://www.nps.gov/blca/forteachers/upload/senses.pdf • http://exchange.smarttech.com/details.html?id=830a291e-775b-4636-a066-4241925f04c7 • http://www.youtube.com/watch?v=hqV77Nh_yHg • http://www.littlegiraffes.com/fivesenses.html <p>What is water? What role does water play in a wetland? How do wetlands change with the seasons?</p> <p>Correlations to <i>Macmillan/McGraw-Hill Science</i> (2002)</p> <ul style="list-style-type: none"> • Unit A, Plants are Living Things, Lesson 3 • Unit E, Water, Water Everywhere, Lessons 3, 5 and 6 • Unit D, Caring for Earth, Lesson 3 • Unit C, The sky and Weather, Lessons 6 and 7
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			<p>b) physical characteristics (body coverings, body shape, appendages, and methods of movement); and</p> <p>c) other characteristics (wild/tame, water homes/land homes).</p> <p>1.7 The student will investigate and understand the relationship of seasonal change and weather to the activities and life processes of plants and animals. Key concepts include how temperature, light, and precipitation bring about changes in</p> <p>a) plants (growth, budding, falling leaves, and wilting); and</p> <p>b) animals (behaviors, hibernation, migration, body covering, and habitat).</p>	<p>Websites</p> <p>BrainPop</p> <ul style="list-style-type: none"> • http://www.brainpopjr.com/science/weather/watercycle/preview.weml <p>Which plants and animals live in wetlands? Why are wetlands important for wildlife? Are wetlands endangered?</p> <p>Correlations to <i>Macmillan/McGraw-Hill Science</i> (2002)</p> <ul style="list-style-type: none"> • Unit D, Caring for Earth, Lesson 6 <p>Websites</p> <ul style="list-style-type: none"> • http://www.nwf.org/Kids/Ranger-Rick/People-and-Places/Whats-a-Wetland.aspx • http://library.thinkquest.org/J003192F/game.htm • http://www.greenwing.org/greenwings/fun/fun5.html <p>Wetlands Reading List</p> <p><i>Box Turtle at Long Pond</i>, William T. George</p> <p><i>Come Out, Muskrats</i>, Jim Arnosky</p> <p><i>Common Frog</i>, Oxford Scientific Films</p> <p><i>Dragonflies</i>, Cynthia Overbeck</p> <p><i>Fish Eyes</i>, Lois Ehleert</p> <p><i>If You Were a Wild Duck Where Would You Go?</i>, George Mendoza</p> <p><i>Let's Find Out About Frogs</i>, Corrine J. Naden</p> <p><i>Lily Pad Pond</i>, Bianca Lavies</p> <p><i>The Lorax</i>, Dr. Seuss</p> <p><i>Make Way for Ducklings</i>, Robert McCloskey</p>
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				<i>The Noisy Counting Book</i> , Susan Schade and Jon Butler <i>Old Mother West Wind</i> , Thornton W. Burgess <i>Puddles and Ponds</i> , Rose Wyler <i>Rain Drop Splash</i> , Alvin Tresselt <i>A River Dream</i> , Allen Say <i>River Parade</i> , Alexandria Day <i>The Seminole</i> , Emilie U . Lepthier <i>Spring Peepers</i> , Judy Hawes <i>The Ugly Duckling</i> , Hans Christian Anderson <i>Willa in Wetlands</i> , Peyton Lewis and Rory Chalcraft

Grade Level	Enduring Understandings	Essential Questions	Correlated Virginia Standards of Learning (SOL) 2010	Digital and Print Resources for Teaching (including unit specific essential questions)
Second Grade	<ul style="list-style-type: none"> Science is a structured process for asking and answering questions about our natural and human-made environment? Scientists design and conduct investigations to gather data and information to answer questions about natural phenomena. Models are used in science to represent real-world things. Environmental scientists study wetlands. Both plants and animals have life cycles. Wetlands are 	<ul style="list-style-type: none"> What is science? Who is a scientist? What kinds of questions do scientists ask? How do observations and inferences differ? Why are the classification systems used in science? Why are models used in science? How do plant and animal life cycles compare? Why are life cycles important for development of organisms? How does 	<p>2.1 The student will conduct investigations in which</p> <ol style="list-style-type: none"> observation is differentiated from personal interpretation, and conclusions are drawn based on observations; observations are repeated to ensure accuracy; two or more attributes are used to classify items; conditions that influence a change are defined; length, volume, mass, and temperature measurements are made in metric units (centimeters, meters, liters, kilograms) and standard English units (inches, feet, yards, cups, pints, quarts, gallons, degrees Fahrenheit, ounces, pounds); pictures and bar graphs are constructed using numbered axes; and simple physical models are constructed. <p>2.4 The student will investigate and understand that plants and animals undergo a series of orderly changes in their life cycles. Key concepts include</p> <ol style="list-style-type: none"> some animals (frogs and 	<p>What is science? What kinds of questions do scientists ask? How are inferences, observations, and conclusions used in science?</p> <p>Correlations to <i>Macmillan/McGraw-Hill Science</i> (2002) Who's a scientist? S1-S8.</p> <p><u>Websites</u></p> <p><u>BrainPop</u></p> <ul style="list-style-type: none"> http://www.brainpopjr.com/science/sciencskills/scientificmethod/preview.weml http://www.brainpopjr.com/science/sciencskills/makingobservations/preview.weml <p><u>Other Sites</u></p> <ul style="list-style-type: none"> http://pbskids.org/dragonflytv/scientists/index.html http://www.biology4kids.com/files/studies_scimethod.html http://pbskids.org/dragonflytv/scientists/scientist59.html http://www.youtube.com/watch?v=3hlkRcTmFxy&feature=relmfu http://www.youtube.com/watch?v=V87I10yMIb4&feature=relmfu <p>How are the life cycles of plants and animals alike? How are they different? What plants and animals live in a wetland?</p>

	<p>affected by factors such as weather, seasons, as well as the plants and animals that live there.</p> <ul style="list-style-type: none"> • Weathering and erosion are important influences on wetlands. 	<p>weather affect wetlands, and the plants and animals that live there?</p> <ul style="list-style-type: none"> • What effects do the different seasons have on wetlands, and wetland plants and animals? • What effects do weathering and erosion have on wetlands? 	<p>butterflies) undergo distinct stages during their lives, while others generally resemble their parents; and</p> <p>b) flowering plants undergo many changes, from the formation of the flower to the development of the fruit.</p> <p>2.6 The student will investigate and understand basic types, changes, and patterns of weather. Key concepts include</p> <p>a) temperature, wind, precipitation, drought, flood, and storms; and the uses and importance of measuring and recording weather data.</p> <p>2.7 The student will investigate and understand that weather and seasonal changes affect plants, animals, and their surroundings. Key concepts include</p> <p>a) effects on growth and behavior of living things (migration, hibernation, camouflage, adaptation, dormancy); and</p> <p>b) weathering and erosion of the land surface.</p>	<p>Correlations to <i>Macmillan/McGraw-Hill Science</i> (2002)</p> <p>Unit A, Plants and Animals, Chapter 1, Lessons 1 and 3</p> <p>Unit A, Plants and Animals, Chapter 2, Lessons 5 and 7</p> <p>Unit B, Homes for Plants and Animals, Chapter 4, Lesson 6 and 8</p> <p>Websites</p> <p>BrainPop</p> <ul style="list-style-type: none"> • http://www.brainpopjr.com/science/plants/plantlifecycle/preview.weml <p>Other Sites</p> <ul style="list-style-type: none"> • http://www.lisd.org/technology/itswebs/elem/curr/science/2sciwebsites.htm • http://www.kidskonnnect.com/subject-index/15-science/87-life-cycles.html • http://www.topmarks.co.uk/interactive.aspx?cat=64 <p>What are wetlands? How do wetlands change with the seasons? How can we protect wetlands?</p> <p>Correlations to <i>Macmillan/McGraw-Hill Science</i> (2002)</p> <p>Unit D, The Sun and Its Family, Chapter 7, Lessons 1 and 2</p>
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Grade Level	Enduring Understandings	Essential Questions	Correlated Virginia Standards of Learning (SOL) 2010	Digital and Print Resources for Teaching (including unit specific essential questions)
Third Grade	<ul style="list-style-type: none"> Science is a structured process for asking and answering questions about our natural and human-made environment. Scientists design and conduct investigations to gather data and information to answer questions about natural phenomena. Models are used in science to represent real-world things. Many types of measurement are used in science. Environmental scientists study wetlands. 	<ul style="list-style-type: none"> What is science? What kinds of questions do scientists ask? Why are data important in conducting scientific investigations? Why is measurement important in conducting scientific investigations? How do mathematics and science work together to answer questions and solve problem? How are STEM and science related? 	Scientific Investigation, Reasoning, and Logic 3.1 The student will demonstrate an understanding of scientific reasoning, logic, and the nature of science by planning and conducting investigations in which a) observations are made and are repeated to ensure accuracy; b) predictions are formulated using a variety of sources of information; c) objects with similar characteristics or properties are classified into at least two sets and two subsets; d) natural events are sequenced chronologically; e) length, volume, mass, and temperature are estimated and measured in metric and standard English units using proper tools and techniques; f) time is measured to the nearest minute using proper tools and techniques; g) questions are developed to formulate hypotheses; h) data are gathered, charted, graphed, and analyzed;	What is science? What kinds of questions do scientists ask? Why are data important in conducting scientific investigations? Why are models used in science? Correlations to <i>Macmillan/McGraw-Hill Science</i> (2002) Invitation to Science, S1-S8,k R2, R6, R7, R8, R9, and R11 <u>Websites</u> <u>BrainPop</u> <ul style="list-style-type: none"> http://www.brainpop.com/science/scientificinquiry/scientificmethod/preview.weml http://www.brainpop.com/science/scientificinquiry/metricunits/preview.weml Explore Learning (Gizmos) <ul style="list-style-type: none"> http://www.explorelearning.com/index.cfm?method=cResource.dspDetail&resourceID=666 http://www.explorelearning.com/index.cfm?method=cResource.dspDetail&resourceID=1048 http://www.explorelearning.com/index.cfm?method=cResource.dspDetail&resourceID=1051 http://www.explorelearning.com/index.cfm?method=cResource.dspDetail&resourceID=663 http://www.explorelearning.com/index.cfm?method=cResource.dspDetail&resourceID=641

	<ul style="list-style-type: none"> • Plants and animals have adaptations that enable them to live in a wetland. • Wetlands are a unique type of ecosystem. • Soil is an important component in wetlands. • The water cycle is important to the development and maintenance of wetlands. 	<ul style="list-style-type: none"> • How do plants and animals adapt to wetlands? • What makes wetlands a unique ecosystem? • How is soil important to wetlands? • What role does water play in wetlands? 	<ul style="list-style-type: none"> i) unexpected or unusual quantitative data are recognized; j) inferences are made and conclusions are drawn; k) data are communicated; l) models are designed and built; and m) current applications are used to reinforce science concepts. <p>Life Processes</p> <p>3.4 The student will investigate and understand that adaptations allow animals to satisfy life needs and respond to the environment. Key concepts include</p> <ul style="list-style-type: none"> a) behavioral adaptations; and b) physical adaptations. <p>Living Systems</p> <p>3.5 The student will investigate and understand relationships among organisms in aquatic and terrestrial food chains. Key concepts include</p> <ul style="list-style-type: none"> a) producer, consumer, decomposer; b) herbivore, carnivore, omnivore; and c) predator and prey. <p>3.6 The student will investigate and understand that ecosystems support a diversity of plants and animals that</p>	
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			<p>share limited resources. Key concepts include</p> <ol style="list-style-type: none"> aquatic ecosystems; terrestrial ecosystems; populations and communities; and the human role in conserving limited resources. <p>Interrelationships in Earth/Space Systems</p> <p>3.7 The student will investigate and understand the major components of soil, its origin, and its importance to plants and animals including humans. Key concepts include</p> <ol style="list-style-type: none"> soil provides the support and nutrients necessary for plant growth; topsoil is a natural product of subsoil and bedrock; rock, clay, silt, sand, and humus are components of soils; and soil is a natural resource and should be conserved. <p>Earth Patterns, Cycles, and Change</p> <p>3.8 The student will investigate and understand basic patterns and cycles occurring in nature. Key concepts include</p> <ol style="list-style-type: none"> patterns of natural events such as day and night, seasonal changes, simple phases of the moon, and tides; 	<p>Other Sites</p> <ul style="list-style-type: none"> http://pbskids.org/dragonflytv/scientists/index.html http://www.biology4kids.com/files/studies_sciethod.html http://pbskids.org/dragonflytv/scientists/scientist59.html <p>What is an ecosystem? Why is a wetland an example of an ecosystem? What plants and animals live in wetlands? What adaptations do plants and animals show in a wetland? What is unique about wetland soils?</p> <p>Correlations to <i>Macmillan/McGraw-Hill Science</i> (2002)</p> <p>Unit B, Where Plants and Animals Live, Chapters 3 and 4, Lessons 1-6.</p> <p>Unit C, Our Earth, Chapter 5, Lessons 2, 4, and 5.</p> <p>Unit D, Cycles on Earth, Chapter 7, Lesson 2.</p> <p>Websites</p> <p>BrainPop</p> <ul style="list-style-type: none"> http://www.brainpop.com/science/ecologyandbehavior/ecosystems/preview.weml http://www.brainpop.com/science/ecologyandbehavior/foodchains/ http://www.brainpop.com/science/ecologyandbehavior/hibernation/preview.weml http://www.brainpop.com/science/ecologyandbehavior/migration/preview.weml
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			<p>b) animal life cycles; and c) plant life cycles.</p> <p>3.9 The student will investigate and understand the water cycle and its relationship to life on Earth. Key concepts include</p> <p>a) there are many sources of water on Earth; b) the energy from the sun drives the water cycle; c) the water cycle involves several processes; d) water is essential for living things; and e) water on Earth is limited and needs to be conserved.</p>	<ul style="list-style-type: none"> • http://www.brainpop.com/science/ecologyandbehavior/symbiosis/preview.weml <p>Explore Learning (Gizmos)</p> <ul style="list-style-type: none"> • http://www.explorelearning.com/index.cfm?method=cResource.dspDetail&resourceID=635 • http://www.explorelearning.com/index.cfm?method=cResource.dspDetail&resourceID=664 • http://www.explorelearning.com/index.cfm?method=cResource.dspDetail&resourceID=639 <p>Other Sites</p> <ul style="list-style-type: none"> • http://www.nwf.org/Kids/Ranger-Rick/People-and-Places/Whats-a-Wetland.aspx • http://el.erdc.usace.army.mil/wetlands/pdfs/ysw1.pdf • http://www.nwf.org/~media/PDFs/Ecosystems/WhatMakesaWetlandWetland-2.ashx • http://water.epa.gov/type/wetlands/index.cfm • http://www.42explore.com/wetland.htm • http://www.mass.gov/czm/waecofun.htm • http://www.ecy.wa.gov/programs/sea/wetlands/index.html • http://ccrm.vims.edu/education/wetlands_selfeds/wetlandsecology.pdf
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Grade Level	Enduring Understandings	Essential Questions	Correlated Virginia Standards of Learning (SOL)	Digital Resources for Teaching (including unit specific essential questions)
Fourth Grade	<ul style="list-style-type: none"> Science is a logical and structured inquiry process for asking and answering questions about natural and human-made environments. Hypotheses, observations, data, conclusions, inferences, and predictions are important in “doing” science. Variables are identified and controlled in scientific inquiry. Measurement and data collection and organization are important concepts in conducting scientific inquiry. 	<ul style="list-style-type: none"> What is science? What kinds of questions do scientists ask? What is scientific inquiry? In what ways are hypotheses, observations, data, conclusions, inferences, and predictions important in “doing” science? How can inquiry be applied to a study of the Indian Springs Wetlands? What are the components of scientific inquiry? Why are measurement and data collection and organization important in science? 	Scientific Investigation, Reasoning, and Logic 4.1 The student will plan and conduct investigations in which <ul style="list-style-type: none"> a) distinctions are made among observations, conclusions, inferences, and predictions; b) hypotheses are formulated based on cause-and-effect relationships; c) variables that must be held constant in an experimental situation are defined; d) appropriate instruments are selected to measure linear distance, volume, mass, and temperature; e) appropriate metric measures are used to collect, record, and report data; f) data are displayed using bar and basic line graphs; g) numerical data that are contradictory or unusual in experimental results are recognized; and h) predictions are made based on data from picture graphs, bar graphs, and basic line graphs. 	<p>What is science? What kinds of questions do scientists ask? Why are data important in conducting scientific investigations? What are variables?</p> <p>Correlations to <i>Macmillan/McGraw-Hill Science</i> (2002) Invitation to Science, S1-S8</p> <p><u>Websites</u></p> <p><u>BrainPop</u></p> <ul style="list-style-type: none"> http://www.brainpop.com/science/scientificinquiry/scientificmethod/preview.weml http://www.brainpop.com/science/scientificinquiry/metricunits/preview.weml http://www.brainpop.com/science/diversityoflife/classification/preview.weml <p>Explore Learning (Gizmos)</p> <ul style="list-style-type: none"> http://www.explorelearning.com/index.cfm?method=cResource.dspDetail&ResourceID=666 http://www.explorelearning.com/index.cfm?method=cResource.dspDetail&ResourceID=1048 http://www.explorelearning.com/index.cfm?method=cResource.dspDetail&ResourceID=1051

	<ul style="list-style-type: none"> • Scientists learn about wetlands through scientific inquiry. • Scientific inquiry is a process consisting of questions, observations, data collection and organization, and drawing of conclusions. • An hypothesis is an educated guess, something not proven but assumed to be true for purposes of argument or further study or investigation. • Wetlands are important ecosystems and provide an excellent environmental laboratory for conducting scientific inquiry. 	<ul style="list-style-type: none"> • In what ways do predictions and inferences differ? • Why are wetlands considered to be important ecosystems? • What plants and animals are unique to wetlands? • How is the unifying theme of form and function evident in leaves, stems, roots, and flowers of plants? • How is reproduction similar in plants? • What can be learned about all plants from studying wetland plants? • What life cycles of both plants and animals can be observed by studying a wetland? 	<p>Life Processes</p> <p>4.4 The student will investigate and understand basic plant anatomy and life processes. Key concepts include</p> <ol style="list-style-type: none"> a) the structures of a typical plant (leaves, stems, roots, and flowers); and b) processes and structures involved with reproduction (pollination, stamen, pistil, sepal, embryo, spore, and seed); <p>Living Systems</p> <p>4.5 The student will investigate and understand how plants and animals in an ecosystem interact with one another and the nonliving environment. Key concepts include</p> <ol style="list-style-type: none"> a) behavioral and structural adaptations; b) organization of communities; c) flow of energy through food webs; d) habitats and niches; and e) life cycles; and influence of human activity on ecosystems. <p>Earth Resources</p> <p>4.9 The student will investigate and understand important Virginia natural resources. Key concepts include</p> <ol style="list-style-type: none"> a) watersheds and water resources; b) animals and plants; 	<ul style="list-style-type: none"> • http://www.explorelearning.com/index.cfm?method=cResource.dspDetail&ResourceID=663 <p>What structures are common to all plants? Do all plants produce seeds? What structures are unique to animals? Do all animals have backbones? How do plants adapt and respond to their environments?</p> <p>Correlations to <i>Macmillan/McGraw-Hill Science</i> (2002)</p> <p>Unit A, The World of Living Things, Chapter 1, Lessons1-5</p> <p>Unit A, The World of Living Things, Chapter 2, Lessons 6-7</p> <p>Unit B, Animals as Living Things, Chapter 3, Lessons 1-3</p> <p>Unit B, Animals as Living Things, Chapter 4, Lesson 6</p> <p>Websites</p> <p>BrainPop</p> <ul style="list-style-type: none"> • http://www.brainpop.com/science/diversityoflife/seedplants/preview.weml • http://www.brainpop.com/science/diversityoflife/seedlessplants/preview.weml • http://www.brainpop.com/science/diversityoflife/algae/preview.weml • http://www.brainpop.com/science/cellularlifeandgenetics/pollination/preview.weml
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	<ul style="list-style-type: none"> • Natural resources such as water and watersheds are used by humans. 	<ul style="list-style-type: none"> • What is a watershed and how are watersheds and wetlands related? 	<p>c) minerals, rocks, ores, and energy sources; and</p> <p>d) forests, soil, and land.</p>	<p>Explore Learning (Gizmos)</p> <ul style="list-style-type: none"> • http://www.explorelearning.com/index.cfm?method=cResource.dspResourcesForCourse&CourseID=355 • http://www.explorelearning.com/index.cfm?method=cResource.dspDetail&ResourceID=637 • http://www.explorelearning.com/index.cfm?method=cResource.dspDetail&ResourceID=615 • http://www.explorelearning.com/index.cfm?method=cResource.dspDetail&ResourceID=641 <p>What is an ecosystem? What is a watershed and wetland? Why is Indian Springs considered a wetland environment? What are some living components in the Indian Springs Wetland? Non-living? What plants and animals are unique to wetlands? What life cycles can be observed in a wetland?</p> <p>Correlations to <i>Macmillan/McGraw-Hill Science</i> (2002) Unit A, The World of Living Things, Chapter 1, Lessons 4-5 Unit B, Animals as Living Things, Chapter 4, Lesson 6</p> <p>Websites</p> <p>BrainPop</p> <ul style="list-style-type: none"> • http://www.brainpop.com/science/ecologyandbehavior/ecosystems/preview.weml
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Grade Level	Enduring Understandings	Essential Questions	Correlated Virginia Standards of Learning (SOL)	Digital Resources for Teaching (including unit specific essential questions)
Fifth Grade	<ul style="list-style-type: none"> Science is an organized and logical pursuit of questions for which people are curious. Questions are designed by scientists in such a way that they can be tested and answered. The nature of science includes concepts such as testable questions, classification systems, measurement, hypotheses, variables, data, predictions, inferences, and models. Water has unique properties and can exist in different states. States of matter are affected by 	<ul style="list-style-type: none"> What is science? What kinds of questions do scientists ask? How are classification systems, measurement, hypotheses, variables, data, predictions, inferences, and models part of the nature of science? Why is water such an important and unique chemical? How are the water cycle, states of matter, and temperature related? How does the “cell theory” apply to plants and animals that live in wetlands? 	Scientific Investigation, Reasoning, and Logic 5.1 The student will demonstrate an understanding of scientific reasoning, logic, and the nature of science by planning and conducting investigations in which <ul style="list-style-type: none"> a) items such as rocks, minerals, and organisms are identified using various classification keys; b) estimates are made and accurate measurements of length, mass, volume, and temperature are made in metric units using proper tools; c) estimates are made and accurate measurements of elapsed time are made using proper tools; d) hypotheses are formed from testable questions; e) independent and dependent variables are identified; f) constants in an experimental situation are identified; g) data are collected, recorded, analyzed, and communicated using proper graphical representations and metric measurements; 	What is the nature of science? What kinds of questions do scientists ask? How is science conducted? Correlations to <i>Macmillan/McGraw-Hill Science (2002)</i> Invitation to Science, S1-S8 Unit A, Structures of Plants and Animals, Chapter1, Lesson 1 BrainPop <ul style="list-style-type: none"> http://www.brainpop.com/science/scientificinquiry/scientificmethod/preview.weml http://www.brainpop.com/science/scientificinquiry/metricunits/preview.weml http://www.brainpop.com/science/diversityoflife/classification/preview.weml Explore Learning (Gizmos) <ul style="list-style-type: none"> http://www.explorelearning.com/index.cfm?method=cResource.dspDetail&ResourceID=666 http://www.explorelearning.com/index.cfm?method=cResource.dspDetail&ResourceID=1048 http://www.explorelearning.com/index.cfm?method=cResource.dspDetail&ResourceID=1051 df http://www.explorelearning.com/index.cfm?method=cResource.dspDetail&ResourceID=1051 df

	<p>temperature.</p> <ul style="list-style-type: none"> Organisms that live in wetlands are composed of cells, just as all organisms are. Plants and animals work together with the non-living environment to develop a community in wetlands. The relationship between form and function is an important concept that can found in all living organisms. 	<ul style="list-style-type: none"> Why are wetlands important ecosystems? Why is Indian Springs Wetlands considered part of the Shenandoah River watershed? How can wetlands be protected? How is the concept of form and function evident in plants and animals that live in wetlands? How are wetlands impacted by weathering and erosion? 	<p>h) predictions are made using patterns from data collected, and simple graphical data are generated;</p> <p>i) inferences are made and conclusions are drawn;</p> <p>j) models are constructed to clarify explanations, demonstrate relationships, and solve needs; and</p> <p>k) current applications are used to reinforce science concepts.</p> <p>Matter</p> <p>5.4 The student will investigate and understand that matter is anything that has mass and takes up space; and occurs as a solid, liquid, or gas. Key concepts include</p> <p>a) distinguishing properties of each phase of matter;</p> <p>b) the effect of temperature on the phases of matter;</p> <p>c) atoms and elements;</p> <p>d) molecules and compounds; and</p> <p>e) mixtures including solutions.</p> <p>Living Systems</p> <p>5.5 The student will investigate and understand that organisms are made of cells and have distinguishing characteristics.</p> <p>Key concepts include</p>	<p>etail&ResourceID=663</p> <p>What is matter? How does temperature affect states of matter? Why is water such a unique chemical? Why is water important to wetlands?</p> <p>Correlations to <i>Macmillan/McGraw-Hill Science (2002)</i></p> <p>Unit E, Properties and Structure of Matter, Chapter 10, Lessons 1-3</p> <p>Unit E, Properties and Structure of Matter, Chapter 11, Lessons 4-7</p> <p>BrainPop</p> <ul style="list-style-type: none"> http://www.brainpop.com/science/matterandchemistry/atomicmodel/preview.weml http://www.brainpop.com/science/matterandchemistry/acidsandbases/preview.weml http://www.brainpop.com/science/matterandchemistry/compoundsandmixtures/preview.weml http://www.brainpop.com/science/matterandchemistry/matterchangingstates/preview.weml http://www.brainpop.com/science/matterandchemistry/periodictableofelements/preview.weml http://www.brainpop.com/science/matterandchemistry/statesofmatter/ http://www.brainpop.com/science/earthsystem/water/preview.weml
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			<p>a) basic cell structures and functions; b) kingdoms of living things; c) vascular and nonvascular plants; and d) vertebrates and invertebrates.</p> <p>Earth Patterns, Cycles, and Change</p> <p>5.7 The student will investigate and understand how Earth's surface is constantly changing. Key concepts include</p> <p>f) weathering, erosion, and deposition; and g) human impact.</p>	<p>Explore Learning (Gizmos)</p> <ul style="list-style-type: none"> • http://www.explorelearning.com/index.cfm?method=cResource.dspDetail&ResourceID=629 • http://www.explorelearning.com/index.cfm?method=cResource.dspDetail&ResourceID=661 • http://www.explorelearning.com/index.cfm?method=cResource.dspDetail&ResourceID=653 <p>Other Websites</p> <ul style="list-style-type: none"> • http://www.kidsgeo.com/geography-for-kids/0131-what-is-water.php • http://en.wikipedia.org/wiki/Properties_of_water <p>Literature</p> <p><i>The Drop In My Drink: The Story Of Water On Our Planet</i> by <u>Hooper Meredith And Coady Chris</u></p> <p>The story of a drop of water, told by a gifted science writer and illustrated with remarkable paintings. Meredith Hooper takes us back thousands of years to see where the Earth's water came from, and how life began in the ocean. She describes the water cycle, the relationship between water and living things and discusses important environmental issues.</p> <p>What is a cell? Are all plants and animals composed of cells? What cell structures are unique to plants? What cell structures are unique to animals? How are plants and</p>
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				<p>animals classified?</p> <p>Correlations to <i>Macmillan/McGraw-Hill Science</i> (2002) Unit A, Structures of Plants and Animals, Chapter 1, Lessons 2-3 Unit A, Structures of Plants and Animals, Chapter 2, Lessons 1-7 Unit A, Structures of Plants and Animals, Chapter 3, Lessons 1-9</p> <p><u>BrainPop</u></p> <ul style="list-style-type: none"> • http://www.brainpop.com/science/cellularlifeandgenetics/cellstructures/preview.weml • http://www.brainpop.com/science/cellularlifeandgenetics/cells/ • http://www.brainpop.com/science/diversityoflife/classification/preview.weml • http://www.brainpop.com/science/diversityoflife/mollusks/preview.weml • http://www.brainpop.com/science/diversityoflife/sixkingdoms/preview.weml <p>What is a wetland? What is a watershed? What is your watershed address? What impact do weathering and erosion have on wetlands?</p> <p>Correlations to <i>Macmillan/McGraw-Hill Science</i> (2002) Unit C, Earth and Its Resources, Chapter6, Lesson 2 Unit C, Earth and Its Resources, Chapter7,</p>
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				<p>Lesson 6</p> <p>Websites</p> <p>BrainPop</p> <ul style="list-style-type: none"> • http://www.brainpop.com/science/earthsystem/erosion/preview.weml • http://www.brainpop.com/science/earthsystem/rivers/preview.weml • http://www.brainpop.com/science/earthsystem/watersupply/preview.weml <p>Other Websites</p> <p>What are Wetlands?</p> <ul style="list-style-type: none"> • http://www.cotf.edu/ete/modules/everglades/FEwetlands1.html • <p>How to Find a Watershed Address</p> <ul style="list-style-type: none"> • http://water.epa.gov/type/watersheds/address.cfm • http://www.youtube.com/watch?v=0_R6P0mj7rc • http://www.pikeconservation.org/Educators/Forms/f1W_shdAddress.pdf <p>Surf Your Watershed</p> <ul style="list-style-type: none"> • http://cfpub.epa.gov/surf/locate/index.cfm <p>Wetlands Scientist</p> <ul style="list-style-type: none"> • http://www.youtube.com/watch?v=gRB3ngufGno&feature=related
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				<p>Weathering and Erosion in Wetlands</p> <ul style="list-style-type: none"> • http://web.mit.edu/12.000/www/m2010/finalwebsite/background/wetlands/wetlands-degradation.html • http://www.americaswetland.com/contestEntryDetail.cfm?sID=682&cat=essay • http://www.geography4kids.com/files/land_erosion.html <p>Wetlands are natural and essential to the health of our environment for all living creatures</p> <ul style="list-style-type: none"> • http://www.ducks.org/conservation/default.aspx?poe=GPPCAD&gclid=CLaerKKtvLACFYZxOgodpjinwow
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